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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/717,897	11/21/2003	Jonathan Phillips	044463-0264	9078

22428 7590 04/14/2006

FOLEY AND LARDNER LLP
SUITE 500
3000 K STREET NW
WASHINGTON, DC 20007

EXAMINER	
COLLINS, CYNTHIA E	
ART UNIT	**PAPER NUMBER**
1638	

DATE MAILED: 04/14/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/717,897	PHILLIPS ET AL.	
	Examiner	Art Unit	
	Cynthia Collins	1638	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *23 January 2006*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-20* is/are pending in the application.

4a) Of the above claim(s) *7-20* is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-6* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *21 November 2003* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date *7/04,11/05*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Election/Restrictions

Applicant's election with traverse of Group I, Claims 1-6, drawn to an isolated polynucleotide, classified in class 536, subclass 24.1, for example, and SEQ ID NO:47, in the reply filed on January 23, 2006 is acknowledged.

The traversal is on the ground(s) that a search of SEQ ID NOs: 8, 24, 27 and 47 would not be unduly burdensome, because each of these polynucleotides are characterized as regulating the expression of genes encoding Cellulose Synthase, and because MPEP 803.04 (August 2005) states that up to ten independent and distinct nucleotide sequences will be examined in a single application without restriction.

This is not found fully persuasive because while the Official Gazette Notice of November 19, 1996 referred to in MPEP 803.04 (August 2005) permitted the examiner to waive restriction to no more than one invention and examine up to 10 independent and distinct nucleotide sequences in a single application, databases and resource allocations at the PTO have changed since 1996, and the examination of more than one sequence on the merits in the instant application would present a burden on PTO resources. In this regard it is noted that SEQ ID NOs: 8, 24, 27 and 47 were obtained from different genes and have different primary nucleotide sequences that must be separately searched. Accordingly SEQ ID NOS:1-46 and 48-85 are withdrawn from consideration as being directed to nonelected inventions.

The traversal is also on the ground(s) that a search of all 9 groups of invention would not be unduly burdensome because the nucleic acid of Group I is part of the DNA constructs and plants employed in Groups II-IX.

This is not found persuasive because the searches of Group I and Groups II-IX are not coextensive. Groups II-IX require additional searches of subject matter not claimed in Group I, i.e. Groups II-IX require additional searches of additional classes and subclasses (class 435, subclass 419; class 47, subclass 17; class 800, subclass 298; class 530, subclass 202), as well as additional searches directed to plant cells comprising at least one polynucleotide operably linked to a desired gene that encodes a polypeptide or protein that is an enzyme involved in the biosynthesis of cell walls, plant cells comprising at least one polynucleotide operably linked to a desired gene that encodes a polypeptide or protein that is an enzyme involved in lignin biosynthesis, plant cells comprising at least one polynucleotide operably linked to a desired gene that produces an RNA transcript that has an antisense sequence of a gene that is endogenous to a plant cell wherein said RNA transcript induces RNA interference of a gene that is normally expressed in a plant cell, plant cultivation methods, and methods for obtaining wood. Accordingly, claims 7-20 are withdrawn from consideration as being directed to nonelected inventions.

The requirement is still deemed proper and is therefore made FINAL.

Claim Objections

Claims 2 and 3 are objected to because of the following informalities: the claims are directed in part to nonelected inventions (SEQ ID NOS: 1-46 and 48-85). Appropriate correction is required.

Claim Rejections - 35 USC § 112

The following is a quotation of the first paragraph of 35 U.S.C. 112:

> The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

Claims 1-6 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention.

The claims are drawn to an isolated nucleic molecule comprising a polynucleotide that is capable of conferring vascular-preferred or xylem-preferred polynucleotide transcription, including a polynucleotide of SEQ ID NO:47 and functional variants thereof, and including functional variants having a sequence identity that is greater than or equal to 99%, 98%, 97%, 96%, 95%, 94%, 93%, 92%, 91%, 90%, 89%, 88%, 87%, 86%, 85%, 84%, 83%, 82%, 81%, 80%, 79%, 78%, 77%, 76%, 75%, 74%, 73%, 72%, 71%, 70%, 69%, 68%, 67%, 66%, 65%, 64%, 63%, 62%, 61%, or 60% in sequence to SEQ ID NO:47. The claims are also drawn to an isolated polynucleotide having a sequence selected from (a) sequences complementary to any of the sequences in claim 2; (b) sequences that are reverse complements to any of the sequences in claim 2; and (c) sequences comprising at least 20 contiguous bases, which hybridizes to any of the polynucleotides of (a) or (b). The claims are additionally directed to an isolated nucleic acid molecule of claim 1 wherein the polynucleotide is capable of upregulating or downregulating the expression of an operably linked gene.

The specification describes SEQ ID NO:47 as a 680 bp polynucleotide obtained from a *Pinus radiata* cellulose synthase gene, and discloses that SEQ ID NO:47 functions to confer vascular and xylem preferred polynucleotide transcription (sequence listing; page 58 Table 3; page 75 Table 6). The specification does not describe polynucleotides that are functional variants of SEQ ID NO:47. The specification also does not describe polynucleotides having a sequence complementary to the sequences in claim 2, or polynucleotide sequences that are reverse complements to the sequences in claim 2 or sequences comprising at least 20 contiguous bases which hybridize to the polynucleotides of (a) or (b) of claim 4. The specification additionally does not describe a polynucleotide that is capable of downregulating the expression of an operably linked gene.

The Federal Circuit has recently clarified the application of the written description requirement to polynucleotides. The court stated that "A description of a genus of cDNAs may be achieved by means of recitation of a representative number of cDNAs, defined by nucleotide sequence, falling within the scope of the genus or of a recitation of structural features common to members of the genus, which features constitute a substantial portion of the genus." See *University of California v. Eli Lilly and Co.*, 119 F.3d 1559, 1569; 43 USPQ2d 1398, 1406 (Fed. Cir. 1997).

In the instant case Applicant has not described a representative number of species falling within the scope of the claimed genus which encompasses numerous undisclosed and uncharacterized functional variants of SEQ ID NO:47 having as little as 60% sequence identity to SEQ ID NO:47, nor the structural features unique to the genus that are correlated with their ability to confer vascular and xylem preferred polynucleotide transcription. In the instant case Applicant also has not described a representative number

of species falling within the scope of the claimed genus which encompasses numerous undisclosed and uncharacterized polynucleotides that are complementary to the sequences in claim 2 or that are that are reverse complements to the sequences in claim 2 or sequences or that comprise at least 20 contiguous bases which hybridize to the polynucleotides of (a) or (b) of claim 4, nor the structural features unique to the genus that are correlated with a specific function or activity.

Claims 1-6 are rejected under 35 U.S.C. 112, first paragraph, because the specification, while being enabling for an isolated nucleic acid molecule of SEQ ID NO: 47, does not reasonably provide enablement for other isolated nucleic acid molecules. The specification does not enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and/or use the invention commensurate in scope with these claims.

The claims are drawn to an isolated nucleic molecule comprising a polynucleotide that is capable of conferring vascular-preferred or xylem-preferred polynucleotide transcription, including a polynucleotide of SEQ ID NO:47 and functional variants thereof, and including functional variants having a sequence identity that is greater than or equal to 99%, 98%, 97%, 96%, 95%, 94%, 93%, 92%, 91%, 90%, 89%, 88%, 87%, 86%, 85%, 84%, 83%, 82%, 81%, 80%, 79%, 78%, 77%, 76%, 75%, 74%, 73%, 72%, 71%, 70%, 69%, 68%, 67%, 66%, 65%, 64%, 63%, 62%, 61%, or 60% in sequence to SEQ ID NO:47. The claims are also drawn to an isolated polynucleotide having a sequence selected from (a) sequences complementary to any of the sequences in claim 2; (b) sequences that are reverse complements to any of the sequences in claim 2; and (c)

sequences comprising at least 20 contiguous bases, which hybridizes to any of the polynucleotides of (a) or (b).

The specification discloses a 680 bp polynucleotide of SEQ ID NO:47 obtained from a *Pinus radiata* cellulose synthase gene, and also discloses that SEQ ID NO:47 functions to confer vascular and xylem preferred polynucleotide transcription (sequence listing; page 58 Table 3; page 75 Table 6). The specification does not disclose polynucleotides that are functional variants of SEQ ID NO:47, or polynucleotides having a sequence complementary to the sequences in claim 2, or polynucleotide sequences that are reverse complements to the sequences in claim 2 or sequences comprising at least 20 contiguous bases which hybridize to the polynucleotides of (a) or (b) of claim 4. The specification additionally does not disclose a polynucleotide that is capable of downregulating the expression of an operably linked gene.

The full scope of the claimed invention is not enabled because it is unpredictable whether variants of SEQ ID NO:47 would function to confer gene expression in a plant cell, and whether a polynucleotide that is capable of conferring vascular-preferred polynucleotide transcription would be capable of downregulating the expression of an operably linked gene, because a promoter requires the presence of specific nucleotides and nucleotide sequence motifs in a polynucleotide in order to exhibit specific functional attributes, which nucleotides and motifs may not be present in variants of SEQ ID NO:47, or in a polynucleotide that is capable of conferring vascular-preferred polynucleotide transcription.

Variants of SEQ ID NO:47 may lack key nucleotides required for basal promoter function. See, for example, Kim Y et al. (A 20 nucleotide upstream element is essential

for the nopaline synthase (nos) promoter activity. Plant Mol Biol. 1994 Jan;24(1):105-17), who teach that various point mutations in the nos promoter can alter the level of promoter activity in tobacco. Mutation of one or more key nucleotides in either of two hexamer motifs or in the octamer spacer region between them significantly altered the level of *nos* promoter activity (Table 2, page 109). A single point mutation in the sixth nucleotide of the hexamer motif resulted in a four to ten fold decrease in promoter activity, whereas a double point mutation in the fourth and fifth nucleotide of the hexamer motif resulted in a two-fold increase in promoter activity. Two independent triple point mutations in the third, fourth and fifth, and sixth, seventh and eighth nucleotides of the octamer spacer region eliminated detectable promoter activity.

Variants of SEQ ID NO:47 may also lack key nucleotide motifs required for tissue-specific promoter function, and a polynucleotide that is capable of conferring vascular-preferred polynucleotide transcription may lack key nucleotide motifs required for downregulating the expression of an operably linked gene. See, for example, Buzeli R.A. et al. (Tissue-specific regulation of BiP genes: a cis-acting regulatory domain is required for BiP promoter activity in plant meristems. Plant Mol Biol. 2002 Nov;50(4-5):757-71), who teach that while an AT-rich enhancer-like sequence, designated cis-acting regulatory domain 1, (CRD1) activated expression of the soybean binding protein (BiP) minimal promoter in all organs analyzed, BiP promoter activity in meristematic tissues and phloem cells required the presence of a second activating domain, designated CRD2. also teach that the CRD2 sequence also harbors negative cis-acting elements, because removal of this region caused activation of the promoter in parenchymatic xylem rays, suggesting that the tissue-specific control of BiP gene expression requires a

complex integration of multiple cis-acting regulatory elements on the promoter. (abstract; page 760 Figure 1; page 763 Figure 3; page 765 Figure 6; page 767 Figure 7; pages 768-770).

In the instant case Applicant has not provided guidance with respect to the identity and location of key nucleotides and regulatory regions required for basal or tissue-specific promoter function in variants of SEQ ID NO:47 or required for downregulating the expression of an operably linked gene by a polynucleotide that is capable of conferring vascular-preferred polynucleotide transcription. Absent such guidance it would require undue experimentation for one skilled in the art to use variants of SEQ ID NO:47 or polynucleotides that are capable of conferring vascular-preferred polynucleotide transcription, as one skilled in the art would have to isolated from undisclosed sources and/or synthesize variant polynucleotide sequences, and then test each sequence for basal and vascular-preferred and xylem-preferred promoter function, or for the ability to downregulate the expression of an operably linked gene, in order to discriminate between operative and nonoperative sequences encompassed by the claims.

The claimed invention is also not enabled because the conditions for using a sequence to hybridize to another nucleic acid molecule are unpredictable, since the conditions under which a DNA probe will hybridize to a target sequence vary and depend in part on the specific sequence of the probe and target.

See, for example, Gillespie D. (The magic and challenge of DNA probes as diagnostic reagents. Vet Microbiol. 1990 Sep;24(3-4):217-33. Review), who teaches that specific hybridization between a DNA probe and its target sequence are affected by conditions such as the concentration of probe and target molecules, the length and

sequence of the probe, the hybridization temperature, and the concentration of the salt and detergent present during hybridization (abstract; pages 220-222).

In the instant case the specification does not provide sufficient guidance with respect to which specific nucleotide sequences to use as DNA probes, the conditions for their use, and the specific targets that can be detected using these probes. Absent such guidance one skilled in the art would have to test each of the myriad sequences encompassed by the claims under a variety of different conditions in order to determine which probe sequences are useful for the detection of particular target sequences and which are not. Such a trial and error approach to practicing the claimed invention would constitute undue experimentation.

The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claims 1 and 8 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. Claims 1 and 8 are indefinite in the recitation of "capable of". It is unclear whether the claims require that the polynucleotides in fact perform the recited functions.

Claim 4 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. Claim 4 is indefinite in the recitation of "hybridizes to". It is unclear what types of sequences are encompassed by the claim, as "hybridizes to"

encompasses any and all conditions under which polynucleotides may hybridize to each other.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 1, 5 and 6 are rejected under 35 U.S.C. 102(b) as being anticipated by Bevan M. et al. (Tissue- and cell-specific activity of a phenylalanine ammonia-lyase promoter in transgenic plants. EMBO J. 1989 Jul;8(7):1899-906).

The claims are drawn to an isolated nucleic molecule comprising a polynucleotide that is capable of conferring vascular-preferred and xylem-preferred polynucleotide transcription.

Bevan M. et al. teach an isolated nucleic molecule obtained from a PAL gene from *Phaseolus vulgaris* comprising a polynucleotide that is capable of conferring vascular-preferred and xylem-preferred polynucleotide transcription (page 1900 Figure 2; page 1901 Figures 3-4).

Claim 4 is rejected under 35 U.S.C. 102(b) as being anticipated by Polvere R.I. et al. (GenBank Accession No. U88240, *Trichinella spiralis* hypothetical ORF 2.20 mRNA, partial cds, March 4, 1997).

Claim 4 is drawn to an isolated polynucleotide having a sequence selected from (a) sequences complementary to any of the sequences in claim 2; (b) sequences that are reverse complements to any of the sequences in claim 2; and (c) sequences comprising at least 20 contiguous bases, which hybridizes to any of the polynucleotides of (a) or (b).

Polvere R.I. et al. teach a sequence comprising at least 20 contiguous bases of SEQ ID NO:47. The sequence of Polvere R.I. et al. will hybridize to any of the polynucleotides of (a) or (b) because it has 100% sequence identity to at least 20 contiguous bases of SEQ ID NO:47.

Remarks

No claim is allowed.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Cynthia Collins whose telephone number is (571) 272-0794. The examiner can normally be reached on Monday-Friday 8:45 AM -5:15 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Anne Marie Grunberg can be reached on (571) 272-0975. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Cynthia Collins
Primary Examiner
Art Unit 1638

CC

Cynthia Collins
4/4/06